EARLY COST-EFFECTIVENESS ANALYSIS OF CONTINUOUS MONITORING OF LUNG-AERATION WITH ELECTRICAL IMPEDANCE TOMOGRAPHY IN PRETERM NEONATES WITH RESPIRATORY DISTRESS SYNDROME

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OBJECTIVES: Respiratory distress syndrome (RDS) is relatively common in preterm neonates due to lung immaturity. Clinical management by respiratory support is associated with high complications rates. Guidance on appropriate lung-aeration is limited using conventional thorax X-ray monitoring. Electrical impedance tomography (EIT) allows radiation-free, continuous lung-aeration monitoring to guide effective respiratory support. Clinicians expect EIT implementation to reduce the number of patients requiring mechanical ventilation, and overall complication rates and hospitalisation length. We conducted an early cost-effectiveness analysis of EIT monitoring in preterm neonates with RDS versus standard care in the Netherlands.

METHODS: A decision-analytic model was constructed comparing costs and effects of conventional X-ray versus EIT monitoring for preterm neonates with RDS from the healthcare perspective with a time horizon of two years. Input parameters were based on literature and cost databases. The effects of EIT monitoring were based on consensus by 6 clinical experts for two scenarios, (1) a conservative scenario assuming only a decrease of patients on mechanical ventilation under EIT monitoring, and (2) an optimistic scenario including scenario (1) and assuming an additional 10% relative complication rate decrease in comparison to standard care. Main outcomes were total average costs per patient, number of patients with

bronchopulmonary dysplasia (BPD), and mortality. One-way sensitivity analyses were conducted.

RESULTS: EIT monitoring was estimated to be cost-saving in both scenarios, mainly due to a shorter average hospital length of stay. Total incremental costs per patient for EIT monitored care versus standard care were -€929 and -€10,706 for scenario (1) and (2), respectively. The number of patients with BPD and deaths were reduced. Results were robust to changes in input parameters.

CONCLUSIONS: EIT lung-aeration monitoring in preterm neonates is expected to result in cost-savings and lower mortality and BPD rates, in comparison to standard care, in a Dutch hospital setting.